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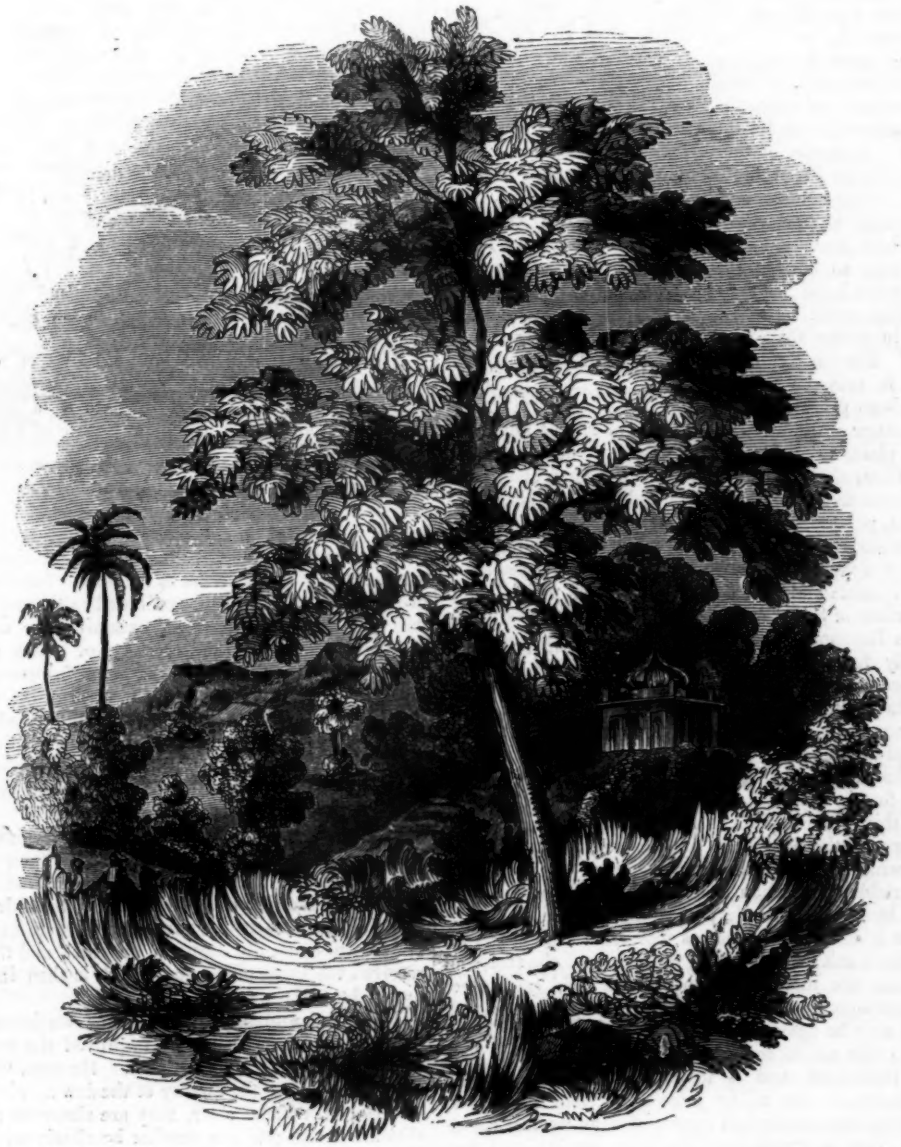
THE CAOUTCHOUC TREE.



[The Caoutchouc Tree (*Ficus Elastica*).]

THE remarkable substance known as caoutchouc is produced from several different plants of the same genus as the common fig-tree. The number of species of Ficus is indeed considered to be as great as that of any arborescent plant, but they flourish only in tropical countries or in the warmest regions of the temperate zone. Some creep like the ivy, while others rear their heads as high as any of the trees of the forest, their large leaves affording a thick shade and a delightful shelter from a tropical sun. For a man to sit under his own fig-tree in the climate where those trees are indigenous conveys associations of the pleasantest kind. Fraser speaks thus of what he saw of their habits in the forests at Moreton Bay in New Holland:—"I observed several species of Ficus upwards of 150 feet high, enclosing immense iron-bark trees, on which originally the seeds of these fig-trees had been deposited by birds. Here they had immediately vegetated, and thrown out their parasitical and rapacious roots, which, adhering close to the bark of the iron-tree, had followed the course of its stem downwards to the earth, where, once arrived, their progress of growth is truly astonishing." Some of the genus are remarkable

for throwing out roots from their branches, which, on reaching the ground, establish themselves there, and an individual tree thus extends itself over a considerable space of ground, forming a series of leafy alcoves. The Banyan-tree (described in No. 22) is an instance of this peculiar habit. The *Ficus religiosa* is planted near houses in India for the sake of its grateful shade. The Hindu deity Vishnoo is fabled to have been born under its branches.

The juices and produce of the Ficus genus possess various qualities, some species yielding deadly poison, and others cooling and refreshing fruits. The milk of the common fig is extremely acrid when the fruit is in an unripe state, but in its progress towards maturity the chemical elements of which it consists enter into new combinations, and fortunately lose the acrid quality which would otherwise render them unfit for the consumption of man. A species of the fig-tree in Sumatra is known to botanists as *Ficus toxicaria*, and in Tanjore another tree of the same class is termed *Ficus dæmona*, from the virulent character of their juices. The Upas of Java, which contains most deadly poison, is of the Ficus genus, and so also is the American cow-tree, which on the other hand yields a cool and agreeable beverage resembling milk. The leaves of some of the fici are tonic; in others they act as an emetic; in some as a caustic. The bark of others is used for tanning, and in several it may be taken as a tonic. Nature seems to have been profuse in investing the genus with an extensive range of qualities beyond that of almost any other class of plants; but nearly all of them yield caoutchouc.

The *Ficus elastica*, from which caoutchouc is chiefly obtained, is a native of South America and India. "It has shining, oval, pointed, thick leaves, small axillary uneatable fruits the size of an olive, and long pink or red terminal buds composed of the stipules rolled together. This species inhabits the Pundua and the Juntipoor mountains, which bound the province of Silhet on the north, where it grows to the size of a European sycamore, and is called Kasmeer. It is chiefly found in the chasms of rocks and over the declivities of mountains, among decomposed rocks and vegetable matter. It produces when wounded a great abundance of milk, which yields about one-third of its weight of caoutchouc. It grows with great rapidity; a tree is described as being twenty-five feet high, with the trunk a foot in diameter, when only four years old. The juice of this valuable plant is used by the natives of Silhet to smear over the inside of baskets constructed of split rattan, which are thus rendered water-tight. Old trees yield a richer juice than young ones. The milk is extracted by incisions made across the bark down to the wood, at a distance of about a foot from each other, all round the trunk or branch, up to the top of the tree, and the higher the more abundant is the fluid said to be. After one operation the tree requires a fortnight's rest, when it may be again repeated. When the juice is exposed to the air it separates spontaneously into a firm elastic substance and a fetid whey-coloured liquid. Fifty ounces of pure milky juice taken from the trees in August yielded exactly 15½ ounces of clean washed caoutchouc. This substance is of the finest quality, and may be obtained in large quantities."* The *Ficus elastica* may often be seen in the hothouses of this country.

The use of caoutchouc with which we are most familiar is that of removing the marks of lead pencil from paper, and its most common name is Indian rubber. It is not much more than a century since it was introduced into Europe, and the manner of its production was at first unknown. In 1735 some members of the French Academy of Sciences visited South America, when they found it was the thickened juice of a Brazilian tree, and in the following year an account of its preparation was given to the Academy. The best time for obtaining the greatest quantity of caoutchouc is in the rainy season, when the trees being pierced, a thick juice, having neither taste nor smell, exudes, which on its first appearance is of a yellowish white colour, and afterwards becomes darker by exposure to the atmosphere, and also solidified. Several coatings of caoutchouc being successively applied to the exterior surface of clay models of bottles, they are dried over fires, in the course of which each stratum of caoutchouc becomes blackened by the smoke. The lines usually visible on the exterior of a bottle of Indian rubber are traced with a blunt tool. After being exposed to the drying effect of fire for a sufficient length of time, the clay is crushed and shaken out of the bottles, which are then ready for exportation. The Indians had long been in the habit of making boots of caoutchouc, which were perfectly waterproof, and the inhabitants of Quito were accustomed to employ it in the manufacture of cloth. Caoutchouc gives a soft and beautiful light, and before the demand in Europe became so great the South Americans were in the habit of employing it in flambeaux. One of these, an inch and a half in diameter and two feet long, would burn during twelve hours. The caoutchouc obtained from India is prepared in a different manner from that which is followed in South America, being, when imported, in a solid flat state, and not blackened.

The chemical properties and affinities of caoutchouc, which adapt it for a great variety of purposes, must be treated in connection with its uses as a substance of growing importance in the manufacture of an increasing variety of articles.

* 'Penny Cyclopædia,' art. FICUS.

PEARLS.

THE enormous value attached in ancient times to some extraordinary pearls seems to be almost fabulous; much of this must of course be attributed to the caprice which will pay any price, however excessive, for whatever is unique in its kind, the possession of which may be an object of competition; and the manufacture of artificial pearls had not then lowered the price of the real jewel. But though no longer so extravagantly valued, the pearl must always be a favourite; its delicate and silvery lustre, in the words of an admirer, "relieves the eye after gazing at the brilliancy of the diamond, as the soft brightness of the moon after the dazzling fire of the sun."

The finest pearls are found in the neighbourhood of India, and the Hindus poetically ascribe their production to drops of dew which fall into the shells of the fish in which they are formed. A Brahman told Mr. Le Beck that the fish rises to the surface of the sea in the month of May, to catch the drops in his shell, and that he thus received the germ of a pearl, which is then impregnated by the heat of the sun.

Pliny had probably received some version of this Indian idea, and, as usual, he improved the story by the addition of something of his own. He says, "The pearls vary according to the quality of the dew by which they are formed; if that be clear, they are also clear; if turbid, they are turbid; if the weather be cloudy when the precious drop is received into the shell, the pearl will be pale-coloured; if the shell has received a full supply, the pearl will be large; but lightning may cause it to close too suddenly, and then the pearl will be very small; when it thunders during the reception of the drop, the pearl thence resulting will be a mere hollow shell of no consistency."

Augurello, an Italian writer of the fifteenth century, has introduced the idea in a Latin poem in these words:

. . . . . "Cum se summo pandunt in marmore concæ,
Ut genitalis eas anni stimulaverit hora,
Implenturque levi conceptu roris hiantes,
Et gravidæ certo mox edunt tempore fœtus,
Ætheriusque illis fit candens unio partus."

("When the shells open on the surface of the deep, excited by the genial season, they are filled by the light fertilizing dew; thence in due time they bring forth their young, and the brilliant pearl is the ethereal produce.")

The truth is much less poetical than the fiction. The pearl is generally admitted to be a sort of disease, a morbid concretion produced in the body of several species of molluscous fishes. How it begins is not precisely known; probably a grain of sand or other minute substance may have found its way into the shell, and there produced irritation; the efforts of nature, if unable to expel the cause of uneasiness, would be excited to render it less injurious by covering it with layers of calcareous matter, and thus the pearl might be formed. That it is injurious to the animal appears from the observation of pearl-fishers, that the smooth shells rarely, if ever, contain pearls, while the distorted shell is seldom without one.

Pearls are found in Europe, Asia, and America. The Romans procured them from Britain almost two thousand years ago, though not of excellent quality; and in modern times, considerable quantities have been furnished from Scotland. It is stated that the rivers of Perthshire supplied the London market with pearls to the amount of 10,000*l.* annually for several years, about the middle of the last century. In Russia they are produced in the provinces of Novgorod, Tver, and Pskov, and until the year 1776 they were considered imperial property wherever they were found. Several rivers of Saxony, Bavaria, Bohemia, and Silesia afford pearls, and it has been remarked that in several cases the production extends to a small part only of their course. Thus, the little river Elster, which rises in the Erzgebirge of Saxony, on the borders of Bohemia, contains many pearl shells from its source to the town of Elsterberg, a distance of fifteen miles; beyond this none are met with; the cessation is with much probability attributed to the confluence of the river Triblerbach, which in its course turns several large mill-wheels used in mining operations. This supposition is corroborated by the fact that the Triblerbach itself produced pearls previous to the erection of the machines upon it.

In America the fishery has chiefly been confined to the Gulf of Mexico and to the eastern coast of California; in the Gulf, the principal places were the arm of the sea between Cubagua and Coche, and the mouth of Rio de la Hacha. The Islas de las Perlas, in the Gulf of Panama, also received their name from their furnishing pearls. All these places formerly supplied large quantities, and they were fished by the natives before their discovery by Europeans; but the beds now appear to be exhausted, and the produce is now scarcely worth anything.

Asia is more exclusively the land of Pearls, and the Red Sea, the Persian Gulf, and Indian Ocean are the chief places of their production. An account of the pearl fisheries of Ceylon has been given in the 'Penny Magazine,' No. 70, and it is probably the same as that mentioned by Pliny eighteen centuries ago. Asia still furnishes the great majority of the pearls worn in Europe.

Some attempts have been made to produce pearls artificially; we do not mean by this to express the manufacture of mock pearls, which has been brought to a high pitch of perfection, but to cause by means of art the growth of pearls in the fish. This the Chinese are said to carry into effect with success, by making small beads of mother-of-pearl, which they thread upon fine silk and fasten within the shells of pearl oysters when they rise to the surface of the water in the beginning of summer; the fish are then replaced in their beds, where the beads are soon covered with calcareous excretions from the body of the animal, and do in fact become genuine pearls. The experiment has been tried in Europe, and it has proved that the fish may thus be compelled to produce pearls; but in the majority of instances the attempt has destroyed the animal, and even when it has succeeded the produce has been of inferior quality. Linnæus communicated to the Swedish government a plan having the same object, which he had formed from the observation that a variety of parasitical animals were frequently found fastened to the shells of the pearl mussel, and that these little creatures sometimes pierced holes through the shells, within which a pearl was often found: his proposition was to imitate this process, by piercing little holes through the shells when fresh caught, and again to deposit them in their original beds. The experiment was tried, but it did not succeed.

A good pearl should be either globular or pear-shaped; according to Jeffries, a celebrated jeweller, "their complexion must be milk white, not of a dead and lifeless, but of a clear and lively hue, free from stains, fouls, spots, specks, or roughness." He condemns all coloured pearls, although the Hindus prefer a yellow tinge, and some nations admire the red. He values them according to their weight, in the following manner:—a pearl of one carat (three grains and one-fifth) is valued at eight shillings; one of two carats at four times that amount; one of three carats at nine times, and so on in a square proportion, multiplying the number of carats by itself, and the product by eight shillings; but the price set upon some pearls of ancient days exceeds this estimate enormously; and even now a pearl of very extraordinary beauty would most probably receive a valuation upon other grounds than its weight.

We shall conclude with a list of some extraordinary pearls mentioned by old authors, and of one or two of modern times.

First, the often-mentioned pearls of Cleopatra, one of which that celebrated queen drank dissolved in vinegar, whilst the other, saved from a similar fate, was slit into halves to form ear-rings for the statue of Venus in the Pantheon.

Julius Cæsar presented to Servilia a pearl valued at six million sesterces, or nearly 50,000*l.* of our money.

A pear-shaped pearl from Panamà was presented to Philip II. of Spain in the year 1579, of the size of a pigeon's egg; it was valued at 4000*l.*

The pearl belonging to the Shah of Persia, seen by Tavernius in 1633, was valued at 32,000 tomans, equal at that time to double the number of pounds sterling. This pearl is believed to be the one which was in the possession of the late king of Persia, Fateh Ali Shah.

A pearl presented by the republic of Venice to Soliman, the emperor of the Turks, was valued at 16,000*l.*

The large pearl in the crown of the emperor Rodolph II. weighed 30 carats, and was the size of a pear. (?)

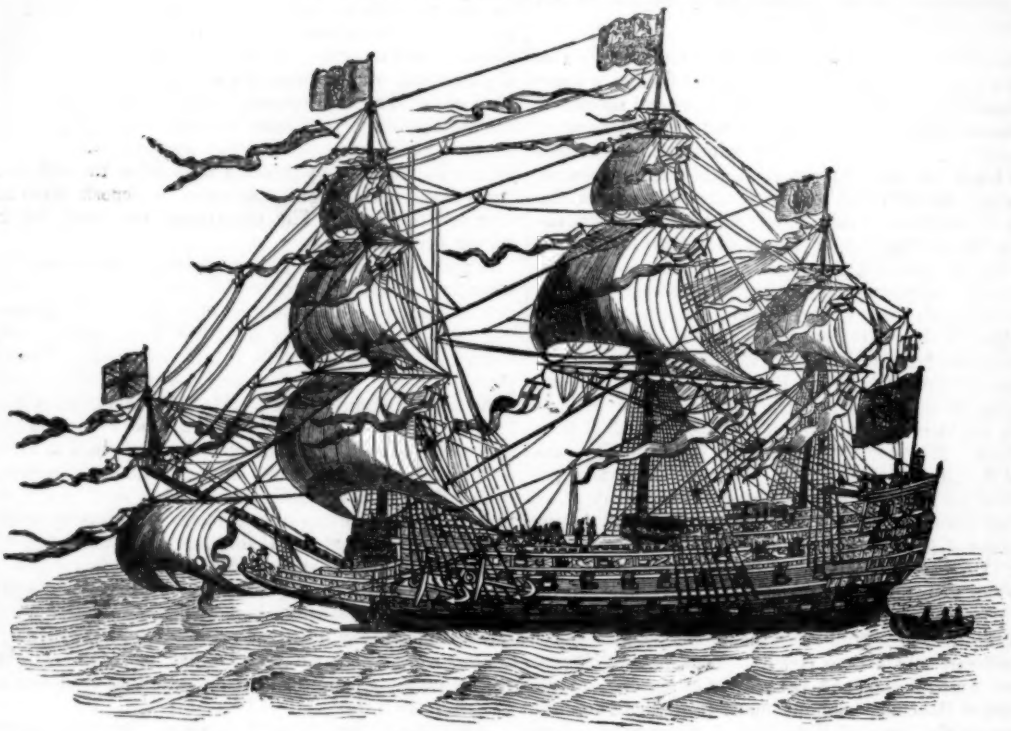
Pope Leo X. bought a pearl of a Venetian jeweller for the sum of 14,000*l.*

A lady in Madrid in the year 1605 wore an American pearl which cost 31,000 ducats.

A large Java pearl, curiously set, was shown at Madras a few years ago. It was made to represent a siren, or mermaid, dressing her hair; the body was formed of the pearl, which was of a long oval form and beautifully pure white; the head and arms were of white enamel, and the lower extremity, forming the fish, of green enamel. The whole was finely carved, and on the girdle were the following words:—"Fallunt aspectus cantusque syrenis."

The most beautiful pearl known is in the museum of Zosima in Moscow; it weighs very nearly 28 carats; it is perfectly globular, and so beautifully brilliant that at first sight it appears transparent. It was bought by Zosima at Leghorn, of a captain of an East India ship. This splendid pearl, which has been named the Pellegrina, is one of the objects of a visit at Moscow.

BRITISH NAVAL HISTORY.—No. IV.



[The Sovereign of the Seas.]

FULLER, speaking of the British navy, says, "Before the reign of Queen Elizabeth the ships royal were so few they deserved not the name of a fleet, when our kings hired vessels from Hamborough, Lubeck, yea, Genoa itself. But such who instead of their own servants use chaire-folke in their houses, shall find their worke worse done, and yet pay deare for it. Queen Elizabeth, sensible of this mischief, erected a navy royal (continued and increased by her successors) of the best ships Europe ever beheld. Indeed, much is in the matter, the excellency of our English oak; more in the making, the cunning of our shipwrights; most in the manning, the courage of our seamen; and yet all to God's blessing, who so often hath crowned them with success.

"If that man who hath *versatile ingenium* be thereby much advantaged for the working of his own fortune, our ships, so active to turn and winde at pleasure, must needs be more useful than the Spanish gallions, whose unwieldiness fixeth them almost in one posture, and maketh them the steadier markes for their enemies. As for Flemish bottoms, though they are finer built, yet as the slender barbe is not so fit to charge with, they are found not so useful in fight. The great *Sovereign*, built at Woolwich, a leiger ship for state, is the greatest ship our island ever saw.

"I am credibly informed that that mystery of shipwrights for some descents hath been preserved successively in families, of whom the Petts about Chattam are of singular regard. Good success have they with their skill, and carefully keep so precious a pearl, lest otherwise among so many friends some foes attain unto it. It is no monopoly which concealeth that from common enemies, the concealing whereof is for the common good. May this mystery of ship-making in England never be lost till this floating world be arrived at its own haven, the end and dissolution thereof!"

These efforts at improvement in ship-building were zealously followed up during the reigns of Elizabeth and James I. The discovery of America, the commerce with Africa, the increasing trade with the East Indies, and the rapidly improving state of intercourse with the rest of the world, had all been operating on naval enterprise and architecture. The progress was still greater in the early part of the reign of Charles I. Sir William Monson, in his naval tracts, remarks, that the general commerce of the kingdom had increased so much during the period intervening between the death of James I. and the commencement of the civil war, that the port of London alone could, in case of emergency, have furnished, at the time hostilities openly commenced between the king and the parliament, one hundred sail of ships of considerable burthen, mounting cannon, and in every respect properly fitted as ships of war.

"Considerable improvement," says Charnock, in his 'History of Marine Architecture,' "appears at this time to have been made in the method of constructing or putting vessels together, as well as in the selection of the materials used for that purpose. The Royal Prince, launched in 1610, was considered as the nonpareil of the time, and never appears to have been employed on any occasion that could materially shake or injure it. Yet it was nevertheless judged incapable of farther service very soon after the accession of Charles I., a period scarcely exceeding fifteen years. On the other hand, the Sovereign of the Seas, though frequently engaged in the most injurious occupations, continued till long after the Revolution (no less a period than sixty years) to be considered as fit for any service the exigencies of the state might require.

"The rude, misshapen floating fabrics which, at the conclusion of the preceding century (the sixteenth), had caused the mighty power of Spain to tremble, and might consequently be said, without arrogance, to have been the arbiters of all coeval maritime disputes, became almost instantaneously exchanged for the intermediate and far more graceful fashion of construction adopted in

the Royal Prince. This ship also in her turn sinks in estimation before the still higher degree of improvement to which the system of naval architecture was brought when the Sovereign of the Seas was built. The high, the enormously towering poop, and no less extravagantly formed forecastle, which only forty years earlier had served but little other purpose than to augment the dangers naturally attendant on the sea service, gradually gave way to that more reasonable form and fashion which Phineas Pett, who was at that time the chief marine architect in the kingdom, very wisely introduced. Could the shades of Howard, of Drake, and of Frobisher have risen from their tombs and beheld the sudden conversion, though they might have readily confessed the wisdom and propriety of the alteration, they would have been little inclined to believe that the new object presented to their eyes was a structure applicable to the same purposes with those on board which they had been accustomed to assert the honour and vindicate the cause of their country."

A description of the Sovereign of the Seas, by Thomas Heywood, was published, under the title of 'A True Description of his Majesty's Royal Ship, built this year, 1637, at Woolwich, in Kent, to the great glory of the English nation, and not to be paralleled in the whole Christian world." After describing her ornamental figures and mottos, the writer says, "There is one thing above all these for the world to take especial notice of, that shee is, besides tunnage, just so many tuns in burden as there have been yeeres since our blessed Saviour's incarnation, namely, 1637, and not one under or over. A most happy omen, which, though it was not the first projected or intended, is now by true computation found so to happen.

"It would bee too tedious to insist upon every ornament belonging to this incomparable vessel, yet this much concerning her outward appearance. She hath two galleries of a side, and all parts of the ship are carved also with trophies of artillery, and types of honour, armes, escutcheons, &c., with several angells holding their letters in compartements; all which workes are quite guilded over, and no other colour but gold and blacke to bee seene about her.

"Her length by the keele is 128 foote, or thereabout, with some few inches. Her mayne breadth or wideness from side to side 48 foote. Her utmost length from the fore-end of the sterne, 232 foote. She is in height, from the bottome of her keele to the top of her lanthorne, 76 foote. She beareth five lanthornes, the biggest of which will hold ten persons to stand upright, and without shouldring or pressing one another.

"She hath three flush deckes and a forecastle, an halfe-decke, a quarter-decke, and a roundhouse. Her lower tyre hath thirty ports, which are to be furnished with demi-cannon and whole cannon throughout, being able to beare them. Her middle tyre hath also thirty ports for demi-culverin and whole culverin. Her third tyre hath twentie-sixe ports for other ordnance. Her forecastle hath twelve ports, and her half-decke hath fourteene ports. She hath thirteene or fourteene ports more within board for murdering-pieces, besides a great many loope-holes out of the cabins for musket shot. She carrieth moreover ten pieces of chase ordnance in her right forward and ten right aft, that is, according to land service, in the front and the reare. She carrieth eleven anchors, one of them weighing four thousand four hundred; and according to these are her cables, mastes, sayles, cordage, which, considered together, seeing His Majesty is at this infinite charge, both for the honour of this nation and the security of his kingdom, it should bee a great spur and encouragement to all his faithful and loving subjects to *bee liberal and willing contributories toward the ship-money.*

"I come now to give you a particular denommation of the prime workmen imployed in this inimitable fabricke: as first, Captayne Phineas Pett, overseer of the worke, and one of the principal officers of His Majesty's navy, whose ancestors, as father, grandfather, and great-grandfather, for the space of two hundred yeares and upwards, have continued in the same name, officers and architectures in the royall navy, of whose knowledge, experience, and judgment I cannot render a merited character.

"The maister builder is young Mr. Peter Pett, the most ingenious sonne of so much improved a father, who, before he was full five-and-twenty yeares of age, made the model, and since hath perfected the worke, which hath won not only the approbation but admiration of all men."

Charnock quotes the following from the journal of Mr. Pett, the builder, as detailing his proceedings when he set about building the Sovereign of the Seas.

"May 14, 1635, I took leave of his Majesty at Greenwich, with his command to hasten into the north to provide and prepare the frame timber, plank, and treenails for the new ship to be built at Woolwich. I left my sons to see the moulds and other necessaries shipped in a Newcastle ship hired on purpose to transport our provisions and workmen to Newcastle. Attending the Bishop of Durham with my commissions and instructions, whom I found wonderfully ready to assist us, with other knights, gentlemen, and justices of the county, who take care to order present carriage, so that in a short time there was enough of the frame ready to lade a large collier, which was landed at Woolwich; and as fast as provisions could be got ready, they were shipped off from Chapley Wood at Newcastle, and that at Barnspeth Park from Sutherland. The 21st of December, we laid the ship's keel in the dock; most part of her frame, coming safe, was landed at Woolwich. The 16th of January, his Majesty, with divers lords, came to Woolwich to see part of the frame and floor laid, and that time he gave orders to myself and my son to build two small pinnaces out of the great ship's waste."

When nearly sixty years old, the Sovereign of the Seas was consumed by fire at Chatham. Her *obituary*, written two days after the event, is as follows:—

"January 29, 1696. The Royal Sovereign was the first great ship that was ever built in England; she was then designed only for splendour and magnificence, and was in some measure the cause of those loud complaints against ship-money in the reign of Charles I. But being taken down a deck lower, she became one of the best men-of-war in the world, and so formidable to her enemies that none of the most daring among them would willingly lie by her side. She had been in almost all the great engagements that had been fought; and in the last fight between the English and French, encountering the Wonder of the World, she so warmly plied the French admiral, that she forced him out of his three-decked wooden castle, and chasing the Royal Sun before her, forced her to fly for shelter among the rocks, where she became a prey to lesser vessels, that reduced her to ashes. At length, leaky and defective herself, she was laid up at Chatham in order to be rebuilt; but being set on fire by negligence, she was, upon the 27th of this month, devoured by that element which so long and so often before she had imperiously made use of as the instrument of destruction to others."

Insect Movements.—The flea, called by the Arabians "the father of leapers," and the locust, jump two hundred times their own length. Supposing the same relative force to be infused into the body of a man six feet high, he would be enabled to leap three times the height of St. Paul's. Insects walk, run, leap, fly, glide, and swim; thus combining all the movements of all animated beings.—*Family Library · History of Insects.*

THE OLD ENGLISH BALLADS.—ROBIN HOOD.—No. VII.

"A famous man was Robin Hood,
The English ballad-singer's joy."—*Wordsworth.*

[Continued from No. 410.]

THIS interference of Robin Hood in spiritual matters, it seems, gave offence to his reverence the Bishop of Hereford, who said that measures should be taken to repress the insolence of the Outlaw, and he promised to look strictly into the matter the first time he chanced to be near Barnesdale. It was on a sunny morning that Robin heard of the Bishop's approach "with all his company," and his joy was excessive.

"Go, kill me a fat buck, said bold Robin Hood,
Go slay me a fair fat deer,
The Bishop of Hereford dines with me to-day,
And he shall pay well for his cheer.

"We will kill a fat buck, then said bold Robin Hood,
And dress it here on the way-side,
And we will watch the good Bishop narrowly,
Lest some other way he should ride."*

He killed and skinned and laid the fat buck to the fire, and with six of his men habited like shepherds, Robin was pacing round and round as the wooden spit with its savoury load revolved, when up came the Bishop of Hereford, who halted, and exclaimed, "What is all this, my masters? For whom do you make such a feast, and of the king's venison, verily? I must look into this." "We are shepherds, simple shepherds, sir," replied the Outlaw meekly; "we keep sheep the whole year round, and as this is our holiday we thought there was no harm in holding it on one of the king's deer, of which there are plenty." "You are fine fellows," said the Bishop; "mighty fine fellows; but the king shall know of your doings: so quit your roast, for to him you shall go, and that quickly."

"O pardon, pardon, cried bold Robin Hood,
O pardon, of thee I pray;
O it ill becomes a holy bishop's coat
For to take men's lives away.

"No pardon, no pardon, the Bishop he said,
No pardon to thee I owe;
Therefore make haste, for I swear by St. Paul,
Before the king you shall go."

On this the Outlaw sprung back against a tree, and setting his horn to his mouth, made in a moment all the wood ring: it was answered, as usual, by the sudden appearance of three score and ten of his comrades, who, with Little John at their head, overpowered the Bishop's guard, and then inquired what was the matter, that he blew a blast so sharp and startling.

"O here is the Bishop of Hereford,
And no pardon we shall have.
Ho, cut off his head, then quoth Little John,
And I'll go make him a grave.

"O pardon, O pardon, then cried the Bishop,
O pardon, of thee I pray;
Oh, had I known that you were so near,
I'd have gone some other way."

Now Robin had no pleasure in shedding blood; but he loved to enjoy the terrors of those whom he captured; and to keep them in suspense while he feasted them on the best was a favourite practice of his. It was in this spirit that he now spoke:

"No pardon, no pardon, said bold Robin Hood,
No pardon to thee I owe;
Therefore make haste, for I swear by my bow,
That to Barnsdale with me you go.

Then Robin he took the Bishop by the hand,
And led him to mery Barnsdale;
And he supt that night in the clear moonlight,
On the good red wine and ale."

How this was to end the Bishop seems to have had a guess. The parody which the Outlaw made on his threats of carrying him to the king showed that he was in a pleasant mood: and the venison collops, and the wine and ale, all showed a tendency to mercy, of which, as it was now late, he took advantage. "I wish, mine host," said the Bishop, with a sort of grave good-nature, "that you would call a reckoning; it is growing late, and I begin to fear that the cost of such an entertainment will be high." Here Little John interposed, for Robin affected, like a high tavern-keeper of the present day, great ignorance in domestic matters, leaving the task of fleecing his guests to his expert dependants. "Lend me your purse, master," said his scrupulous deputy, "and I'll tell you all by-and-by."

"Then Little John took the Bishop's cloak
And spread it upon the ground;
And out of the Bishop's portmantua
He told three hundred pound.

Here's gold enough, master, said Little John,
'Tis a comely thing for to see;
It puts me in charity with the good Bishop,
Tho' he heartily loveth not me.

Robin Hood took the Bishop by the hand,
And causing the music to play,
He made the good Bishop to dance in his boots,
And glad he could so get away."

If we may put trust in ballad and song, the loss of his three hundred pounds dwelt on the Bishop's mind, and at the head of a fair company he went in quest of his entertainer. He had well nigh taken Robin by surprise: he was on him before he was aware; but the Outlaw escaped into an old woman's house, to whom he called, "Save my life; I am Robin Hood, and here comes the Bishop to take me and hang me." "Aye, that I will," said the old woman, "and not the less willingly that you once gave me hose and shoon, when I greatly needed them."

"Then give me, he said, thy gown of gray,
And take thou my mantle of green;
Thy spindle and twine next to me resign,
And take thou mine arrows so keen.

And when Robin Hood was so arrayed,
He went to his trystal-tree;
But with spindle and twine he looked oft behind
For the Bishop and his companee."

When Little John saw Robin coming towards him in this strange guise, he was puzzled, and said aloud, "Who is this so like a witch? I'll e'en try an arrow on her." Robin called, "Hold thy hand; I am thy master; and in this disguise I have escaped from the Bishop of Hereford. But stand where you are; the play is not played out yet—you will see more soon."

"The Bishop he came to the old woman's house,
And called in a furious mood—
Come, soon let me see, and bring quickly to me,
That bold traitor Robin Hood.

The old woman he set on a milk white steed,
And himself on a dapple gray;
And for joy he had gotten him bold Robin Hood,
He went laughing along the way."

The good Bishop's cheer was suddenly changed when at a turn of the road he perceived a hundred and odd archers drawn up in a position which commanded the passage. "Who can this be," he said, "that dares to range the greenwood so freely?" "I am thinking," said the old woman, who had exchanged clothes with the Outlaw, "that it must be one they call Robin Hood." The Bishop turned suddenly round and exclaimed, "And who art thou then?" "I am an old woman, master bishop," she said with a chuckle, "as I shall presently prove." The poor Bishop demanded no proof: the truth flashed upon him at once. "Wo is me," he exclaimed, "woe is me that I ever saw this day." He had more cause to say so when Robin made his appearance, and with the aid of his comrades eased the dignitary of five hundred pounds in gold.

* See cut at page 321.

"Now let him go, said bold Robin Hood;
Little John said, that may not be,
For I vow and protest he shall say us a mass
Before that he go from me.

Then Robin he took the Bishop by the hand,
And 'neath the green trystal-tree
He made him to chaunt out a mass, God wot,
For him and his yeomandree."

The ballad called "Robin Hood's Golden Prize" contains perhaps the most amusing of all his adventures with churchmen. Robin saw that more was to be had by wile and stratagem than by open force: an abbey was a sort of fortified position, a baron's residence was stronger and less accessible still; and nothing remained but frequent change of scene and frequent change of tactics. It was now his pleasure to assume the disguise of a religious person, and with hood, gown, beads, and crucifix, to take to the road like a mendicant friar. He soon met with prey.

"He had not gone miles two or three,
But it was his luck to spy
Two lusty priests, clad all in black,
Coming riding gallantly.

Benedicite, then cried Robin Hood,
Some pity upon me take;
Cross you my hand with a silver groat,
For our dear Ladye's sake."

An appeal to their charity was not likely to be regarded by men who considered themselves in the situation of receivers rather than givers. "By our holy dame, they said, "we have not a penny; we have both been robbed a little way from this, and all we had was taken." Robin, who knew that no one dared to poach on his domain, replied, "Holy men, I fear you are telling an untruth; but before you go farther I am resolved to try." While he was yet speaking the priests rode off roundly, but he soon overtook them.

"Then Robin Hood laid hold of them both,
And pulled them from their horse;
O spare us, spare us, Friar, they cried,
On us have some remorse.

You said you had no money, quoth he,
Therefore without delay
We three shall all fall down on our knees,
And for money earnestly pray."

The two priests complied with a rueful grace, and dropping on their knees along with Robin, cried audibly to the saints, "O send us money—money in our need." They prayed, says the ballad, with a mournful cheer: sometimes they wrung their hands, sometimes they wept, while Robin Hood laughed and sang.

"When they had prayed for one hour's space,
The priests 'gan to lament;
Then quoth bold Robin, now let us see
What money the saints have sent.

For we shall be sharers all alike,
Of the money that we have;
And there is never a one of us
That his fellow shall deceive.

The priests put their hands in their pockets, but could find no money. Robin shook his head, and said he knew the value of good men's prayers, and the condescension of the saints better than to believe that money had not come miraculously to hand: the best way would be to search one another. As he said this he took from the priests' pockets five hundred pieces of gold, and laying them on the grass, told them one by one.

"Here's a brave show, said Robin Hood,
Such store of gold to see;
And each of you shall have a part,
'Cause you prayed so heartily.

He gave them fifty pounds a-piece,
And the rest for himself did keep;
The priests they durst not utter a word,
But they both sighed woundrous deep."

The priests on this rose from their knees, and were about to be gone. "Nay, nay," said Robin Hood, "I cannot part with you yet; you must take three oaths—first, never to tell lies wheresoever you go; secondly, that you shall no more tempt maidens and men's wives to sin; and

"The last oath you shall take is this—
Be charitable to the poor,
And say you learned this from a holy friar,
And I desire no more.

He set them on their horses again,
And away they then did ride;
While Robin returned to the good green wood,
In great joy, mirth, and pride."

From the adventures related in these three ballads, rustic interludes and plays were made which became popular from Cornwall to Caithness. Some of them dealt gently, others severely with the church; but all contained that opening scene in the legend of the Bishop of Hereford, where Robin, in the guise of a shepherd, with six of his comrades, roasted one of the royal bucks by the highway side, and made the haughty prelate eat of it and then pay for his cheer.

A. C.

PHYSICAL CIRCUMSTANCES CONTRIBUTING TO THE PROGRESS OF MANUFACTURES.

[From M'Culloch's 'Statistical Account of the British Empire,' 2nd edition, now publishing.]

Supplies of the raw material may be classed among the more prominent of this description of circumstances; and those who reflect on the nature, value, and importance of our manufactures of wool; of the useful metals, such as iron, tin, lead, copper, &c.; of leather, flax, and so on; will readily admit that our success in them has been materially facilitated by our possessing abundant supplies of the raw material. It is of less consequence, when the material of a manufacture possesses considerable value in small bulk, whether it be furnished from native resources, or be imported from abroad; though, even in that case, the advantage of having an internal supply, of which we cannot be deprived by the jealousy or hostility of others, is far from immaterial. But no nation can make any considerable progress in the manufacture of bulky and heavy articles, the conveyance of which to a distance necessarily occasions a large expense, unless she have supplies of the raw material within herself. Had we been destitute of iron ore, lead, and tin, we could never have distinguished ourselves by the magnitude and value of our manufactures of these articles. But any one who reflects on the signal advantage resulting to every branch of manufacturing industry from being able to procure abundant supplies of iron at the cheapest rate, will be convinced that we are under any thing but slight obligations to our exhaustless stores of this mineral.

But of all the physical circumstances that have contributed to our extraordinary progress in manufactures and industry, none have had so much influence as our possession of the most valuable coal-mines. They have conferred advantages on us not enjoyed in an equal degree by any other country. Our extraordinary success in the manufacture of iron, copper, &c. is not owing so much to our possessing the ores as to our possessing the coal, by the aid of which they have been smelted and refined. But the paramount importance of coal as a manufacturing agent has been principally manifested since the invention of the steam-engine. Without a cheap and abundant supply of fuel, the engine, as now constructed, would be of comparatively little use. It is, as it were, the hands: but coal is the muscles by which they are set in motion, and without which their dexterity cannot be called into action, and they are of no use. Our coal mines may be regarded as vast magazines of *hoarded* or *warehoused power;* and, unless some such radical change should be made on the steam-engine as should very decidedly lessen the quantity of fuel required to keep it in motion, or some equally serviceable machine, but moved by different means, be introduced, it is not at all likely that any nation should come into successful competition with us in those departments in which steam-engines, or machinery moved by steam, may be advantageously employed.

Since the introduction of the steam-engine, waterfalls have lost much of their value; and unless they be very favourably situated, and of a superior description, we no longer reckon them of any considerable importance.

The advantageous situation of the country for commerce, and the nature of its climate, have also powerfully contributed to the perfection of manufacturing industry. Owing to the facilities afforded by our insular situation for maintaining an intercourse with all parts of the world, our manufacturers have been able to obtain supplies of foreign raw materials on the easiest terms, and to forward their own products wherever there was a demand for them. Had we occupied a central internal situation in any quarter of the world, our facilities for dealing with foreigners being so much the less, our progress would have been comparatively slow. But, being surrounded on all sides by the sea, that is, by the great highway of nations, we have been able to deal with the most distant as well as with the nearest people, and to profit by all the peculiar capacities of production enjoyed by each. With such advantages on our side, it would have been singular had we not shot ahead of most of our competitors in the race of improvement.

Our climate is peculiarly favourable for all sorts of exertion and enterprise: without being too severe, it is sufficiently so to render comfortable clothing and lodging indispensable; and, consequently, gives rise to wants that are either unknown, or less sensibly felt, in more genial regions. Its inequality, too, by requiring incessant care and attention on the part of the husbandmen, makes them vigilant and active, as well as industrious; and the qualities that are thus naturally impressed on this great class are, through their example, universally diffused.

Mr. Stevenson, in his valuable article on English statistics in the 'Edinburgh Encyclopædia,' when enumerating the causes of our extraordinary success in manufactures, lays the greatest stress on the superiority of our machinery, the vast magnitude of our capital, and the extent to which the division of labour is carried amongst us. But this is to mistake effects for causes. The circumstances specified by Mr. Stevenson are, in fact, the means and instruments by which manufacturing industry is immediately carried on; and the real inquiry is, What are the circumstances that have rendered us so abundantly supplied with them? We have endeavoured briefly to answer this inquiry, by stating what we believe to have been the most prominent causes of that extraordinary accumulation of capital, and of that employment of improved and powerful machinery, and subdivided labour, which mark our eminence as a manufacturing people. Still, however, we are inclined to think that a good deal must in these matters be ascribed to chance, or to some lucky accident. Had Hargraves, Arkwright, Watt, or Wedgwood not existed, or been born abroad, it is impossible to say how much it might have affected the state of industry here: but there seem to be sufficient grounds for thinking that it would have been, at this moment, materially different from what it actually is. A good deal, too, depends on priority. A country, town, or district that has already established and made a considerable progress in a manufacture, acquires, in consequence, an advantage that may enable it successfully to contend with competitors placed under what are naturally more favourable circumstances: its merchants are already in possession of the markets; its inhabitants, being trained to the business, have acquired that peculiar sleight of hand that is necessary to form expert workmen; and they are in this way frequently able to preserve their ascendancy for a lengthened period, and sometimes even to drive those from the field who have a preponderance of natural advantages on their side.

It seems to be the peculiar good fortune of England that, as respects all the great branches of manufacture, she has at once the advantages of priority and of acquired skill and dexterity on her side, as well as the natural advantages already noticed of abundant supplies of the raw material, of inexhaustible beds of coal, and of situation. Cotton is not an exception; for, though the raw material be the product of other countries, the freight upon it is not very considerable, and is but a trifling deduction from the other circumstances that seem to insure our superiority in this department.

To excel in machine-making, is to excel in what is certainly the most important branch of manufacturing industry. Superiority in any single branch, except this, may exist simultaneously with great inferiority in many others; but eminence in the manufacture of machinery is almost sure to lead to eminence in every other department.

Mr. Stevenson has laid considerable, though not, as it appears to us, too much, stress on the practice generally adopted in Great Britain, of paying workmen, wherever it is practicable, by the piece, or by the work done, and not by the day. This system gives the workmen an interest in being industrious; and makes them exert themselves to execute the greatest quantity of work in the least space of time. And, in consequence of its prevalence, this practice materially influences even the day-labourers; who, to avoid invidious comparisons, make exertions unknown in other countries. Hence, a given number of hands in Great Britain perform much more work than is executed by the same number of hands almost anywhere else: in fact, if we regard wages in their proper light, that is, if we look upon them as a compensation for the quantity of work done, and not for the time spent in doing it, they will, we believe, be found to be cheaper in Great Britain than in most other countries.

Reading.—Mr. Johnson had never, by his own account, been a close student, and used to advise young people never to be without a book in their pocket, to be read at bye-times, when they had nothing else to do. "It has been by that means," said he, to a boy at our house one day, "that all my knowledge has been gained, except what I have picked up by running about the world with my wits ready to observe, and my tongue ready to talk. A man is seldom in a humour to unlock his bookcase, set his desk in order, and betake himself to serious study; but a retentive memory will do something, and a fellow shall have strange credit given him if he can but recollect striking passages from different books, keep the authors separate in his head, and bring his stock of knowledge artfully into play. How else," added he, "do the gamesters manage, when they play for more money than they are worth?"—*Mrs. Piozzi's Anecdotes of Dr. Johnson.*

Training the Mind to Skill in Discovery.—It is practicable to train the mind to greater skill in *discovery*. A few facts will render this sufficiently evident. It will not be denied that some modes of thinking are better adapted to the discovery of truth than others. Those trains of thought which follow the order of cause and effect, premises and conclusion, or, in general, what is considered the order of the understanding, are surely more likely to result in discovery than those which follow the order of the casual relations, as of time, place, resemblance, and contrast, or, as it is commonly called, the order of the imagination. Discovery is the fruit of patient thought, and not of impetuous combination. Now it must be evident that mind directed in the train of the understanding will be a far better instrument of discovery than if under the guidance of the imagination. And it is evident that the one mode of thinking may be as well cultivated as the other, or as any mode whatsoever. And hence has arisen the mighty effect which Bacon produced upon the world. He allured men from the weaving of day-dreams to the employment of their reason. Just in proportion as we acquire skill in the use of our reason will be the progress of truth.—*President Wayland's Address to the members of the American Institute of Instruction.*

Medical Skill.—It deserves to be noted, as a marvellous instance of that truly learned conjecture by which the skill of Dr. Baillie was distinguished, that after many other physicians had severally given their opinions on the nature of Mr. Horner's hidden complaints, Dr. Baillie at once decided against all those theories; but, when he came to propose his own, avowed the extreme uncertainty in which so obscure and difficult a case had left him. However, he said that he guessed it was one or the other of two maladies so rare that he had only seen a case or two of the one, and the other never but in a museum of morbid anatomy. When the body was opened by Vacca at Pisa, where he died, it was found that both those rare diseases existed.—*Speeches of Henry Lord Brougham.*

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